

Claim Listing

CLAIMS

What is claimed is:

1. (Currently Amended) A system for detecting a breach of an exposure protection device by an amount of a target substance, said system comprising:
 - an exposure protection device that isolates a protected environment from an external environment potentially including a target substance, the device including an opaque protective covering, the protective covering comprising at least one that is hermetically sealed by a substantially transparent window, and
 - a detector for indicating the presence of a predetermined level of the target substance, the detector being capable of producing a visually observable indication upon detection of the level of target substance; and
 - wherein said detector is positioned within the protected environment in the vicinity of said window, such that the visually observable indication is observable from the external environment.
- 2.- 5. (Cancelled)
6. (Currently Amended) The system of claim 1, wherein said window is a transparent bubble container.
7. (Original) The system of claim 6, wherein bubble container protrudes outward from said exposure protection device.
8. - 16. (Cancelled)
17. (New) A system for detecting a breach of properties of protective equipment, comprising:
 - an exposure protection device that isolates a protected environment, the exposure protection device comprising:
 - a protective covering;
 - a plurality of openings; and

an enclosure comprising a transparent window hermetically sealed to a surface of the exposure protection device around each of the openings; and
a detector element within the enclosure.

18. (New) The system of claim 17, wherein the detector element indicates a presence of a target substance by changing an optical property.
19. (New) The system of claim 17, wherein the detector element is a colorimetric detector element.
20. (New) The system of claim 19, wherein the colorimetric detector element comprises a reactive reagent impregnated on a chemically inert flat transparent material.
21. (New) The system of claim 19, wherein the colorimetric detector element comprises a layer of bonded particulates impregnated with a reactive reagent.
22. (New) The system of claim 19, colorimetric detector element is visible from an external environment through the window.
23. (New) The system of claim 17, wherein the detector element comprises bulk particulates impregnated with reactive reagent packed in a small cylindrical column and porous retainers.
24. (New) The system of claim 17, comprising a stem, wherein the stem extends downwardly from the lens.
25. (New) The system of claim 17, comprising a stem, wherein the stem extends downwardly from the lens to cover a portion of the detector element.
26. (New) The system of claim 25, wherein the stem prevents exposure of a portion of the detector element to the target substance thus providing an unexposed area of the detector element to compare to the exposed portion of the detector element.

27. (New) The system of claim 17, wherein the plurality of openings are located in exposure protective device at a location selected from the group consisting of a hand location, a face location, a chest location, a waist location, a knee location, a foot location and combinations thereof.
28. (New) The system of claim 17, wherein the exposure protection device is a body suit, hood, glove, or a respiratory facemask.
29. (New) The system of claim 19, wherein the colorimetric detector element is capable of indicating the presence of the target chemical by change of an optical property of the colorimetric detector element.
30. (New) The system of claim 29, wherein the optical property is at least one property selected from color, hue, density, saturation, fluorescence, or luminescence.
31. (New) The system of claim 17, wherein the window is flat, domed, prismatic, or cylindrical.
32. (New) The system of claim 31, wherein the window is domed.
33. (New) The system of claim 31, wherein the window is prismatic; the detector element is flat; and the detector element is positioned on one side of the prismatic window.
34. (New) The system of claim 17, wherein the target substance is a chemical, protein, spore, dust, biological material, metal, toxins from a fungus, a plant, or an organism, biological warfare agents, or chemical warfare agents.
35. (New) A system for detecting a breach of an exposure protection device by an amount of a target substance, said system comprising:
an exposure protection device that isolates a protected environment from an external environment potentially including a target substance, the device including an opaque protective covering, the protective covering comprising at least one opening that is hermetically sealed by a substantially transparent window, and

a detector for indicating the presence of a predetermined level of the target substance, the detector being capable of producing a visually observable color indication upon detection of the level of target substance, wherein said detector is positioned within the protected environment in the vicinity of said window;

a light for irradiating the detector; and

a sensor capable of sensing the color of the detector.

36. (New) The system of claim 35, wherein the light is an LED.

37. (New) The system of claim 36, comprising a fiber optic cable transmitting the light from the LED to the detector.

38. (New) The system of claim 35, comprising a processing unit in communication with the sensor.

39. (New) The system of claim 38, comprising an alarm, wherein the processing unit activates the alarm in response to a specific output of the sensor.

40. (New) The system of claim 38, wherein the alarm is capable of emitting an audible alarm, a visual alarm, a vibration alarm, a radio frequency signal, or a combination thereof.

41. (New) The system of claim 40, wherein the processing unit is configured to activate the alarms when certain levels of a target substance are detected.

42. (New) The system of claim 38, wherein the processing unit is a microprocessing unit.